

1 I claim:

2 1. An apparatus for heating a segment of oil and gas  
3 well bores and surrounding strata comprising:

4  
5 an electrical resistance heating rod,

6  
7 electrical cable for carrying electrical current from an  
8 electrical current source outside of the well bore to  
9 said electrical resistance heating rod when positioned  
10 inside of said well bore;

11  
12 a protective block in which is embedded said electrical  
13 cable and said heating rod where they are connected to  
14 one another, said protective block being constructed of  
15 a moldable material which, when cured, is substantially  
16 impervious to pressure and chemical permeation and oil  
17 and gas well bore bottom pressures and environments;

18  
19 a metallic encasement member encasing said protective  
20 block and sealably welded to form a substantially  
21 impervious enclosure with said block and said embedded  
22 portion of said heating rod and said electrical cable

1           therein, except that said metallic encasement admits said  
2           electrical cable and said heating rod there into for  
3           attachment;

4  
5           a perforated production tubing segment, a proximal  
6           perforated production tubing segment end of which is  
7           reversibly engageable to a distal terminus of oil or gas  
8           well production tubing string and a distal perforated  
9           production tubing segment end of which is engageable with  
10          said metallic encasement member; and

11  
12          a heating rod support frame which extends from said  
13          metallic encasement means opposite its engagement with  
14          said perforated production tubing segment and in which a  
15          portion of said heating rod is supported.

16  
17          2.    The apparatus of claim 1 further comprising a first  
18          and second connector pin, where said first pin joins said  
19          electrical cable to said second pin and said second pin  
20          joins said heating rod to said first pin.

1           3.    The apparatus of claim 2 wherein said protective  
2           block is further comprised of an insulated portion that  
3           encloses the connection between said first pin and said  
4           second pin.

5  
6           4.    The apparatus of claim 3 where said metallic  
7           encasement member contains a reversibly sealable aperture  
8           through which said moldable material may be repeatedly  
9           injected to said block to ensure the absence of any void.

10  
11          5.    The apparatus of claim 4 where said metallic  
12          encasement member is welded together using the "TEG"  
13          welding process so as to impart extraordinary strength to  
14          said metallic encasement member.

15  
16          6.    The apparatus of claim 1 wherein said protective  
17          block is further comprised of an insulated portion that  
18          encloses the connection between said first pin and said  
19          second pin.

20  
21          7.    The apparatus of claim 6 where said metallic  
22          encasement member contains a reversibly sealable aperture

1 through which said moldable material may be repeatedly  
2 injected to said block to ensure the absence of any void.  
3

4 8. The apparatus of claim 7 where said metallic  
5 encasement member is welded together using the "TEG"  
6 welding process so as to impart extraordinary strength to  
7 said metallic encasement member.  
8

9 9. The apparatus of claim 1 where said metallic  
10 encasement member contains a reversibly sealable aperture  
11 through which said moldable material may be repeatedly  
12 injected to said block to ensure the absence of any void.  
13

14 10. The apparatus of claim 9 where said metallic  
15 encasement member is welded together using the "TEG"  
16 welding process so as to impart extraordinary strength to  
17 said metallic encasement member.  
18

19 11. The apparatus of claim 1 where said metallic  
20 encasement member is welded together using the "TEG"  
21 welding process so as to impart extraordinary strength to  
22 said metallic encasement member.

1 12. A method for enhancing production from an oil and  
2 gas well comprising the steps of:

3  
4 selecting an apparatus for heating a segment of oil and  
5 gas well bores and surrounding said apparatus comprising:

6  
7 an electrical resistance heating rod,

8  
9 electrical cable for carrying electrical current from an  
10 electrical current source outside of the well bore to  
11 said electrical resistance heating rod when positioned  
12 inside of said well bore;

13  
14 a protective block in which is embedded said electrical  
15 cable and said heating rod where they are connected to  
16 one another, said protective block being comprised of a  
17 moldable material which, when cured, is substantially  
18 impervious to pressure and chemical permeation and oil  
19 and gas well bore bottom pressures and environments;

20  
21 a metallic encasement member encasing said protective  
22 block and sealably welded to form a substantially

1           impervious enclosure with said block and said embedded  
2           portion of said heating rod and said electrical cable  
3           therein, except that said metallic encasement admits said  
4           electrical cable and said heating rod there into for  
5           attachment;

6  
7           a perforated production tubing segment, a proximal  
8           perforated production tubing segment end of which is  
9           reversibly engageable to a distal terminus of oil or gas  
10          well production tubing string and a distal perforated  
11          production tubing segment end of which is engageable with  
12          said metallic encasement member; and

13  
14          a heating rod support frame which extends from said  
15          metallic encasement means opposite its engagement with  
16          said perforated production tubing segment and in which a  
17          portion of said heating rod is supported;

18  
19          positioning said heating rod adjacent to a production  
20          zone in an oil or gas well bore, production from which  
21          zone is believed to be impeded by viscous materials; and  
22

1           attaching an electrical current source to said electrical  
2           cable; and

3  
4           actuating said electrical current source to heat said  
5           heating rod and thereby heat said viscous materials in  
6           said production zone for reducing viscosity of said  
7           viscous materials for, in turn, producing said viscous  
8           materials.

9  
10          13. The method of Claim 12 wherein said positioning of  
11          said heating rod adjacent to a production zone in an oil  
12          or gas well bore involves positioning said heating rod at  
13          a greater depth within said bore than said production  
14          zone to thereby allow heat from said heating rod to rise  
15          toward said production zone and said viscous materials  
16          situated therein.